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☞See advertisement on last page.

Poetry.

SABBATH STILLNESS ROUND ME.

BY P. A. JORDON.

With this Sabbath stillness 'round me,
With its echoes deep and clear,
With its mystic murmurs ever,
Sounding sweetly on my ear :
With its heaving, wave-like motion,
As the living air goes by,
And the birds, like flitting shadows,
Sweep across the clear, blue sky.

I turn me back in silence,
To the days long gone before,
To the many kind and lovely,
That our souls shall see no more :
To the happy scenes of childhood
With their warm and rosy airs—
To the smiles and looks of gladness,
That our former homestead wears.

O, the summer's long and lovely,
And the meadows broad and clear,
And the brook that sparkled gaily,
With the violets blooming near :
And the deep woods dark and hoary,
Where the shadows heavy lie,
From our happy home they've 'parted—
How we miss them—how we sigh !

Fading always, fading ever,
In this broad bright world of ours ;
Ever changing in its aspects,
Ever gladsome with its flowers :
Soon to us its holy murmurs,
Soon to us its echoes dim,
Shall have lost their soul-felt motion—
O'er our hearts shall cease to swim

MORAL POWERS.

BY THE REV. EDWARD E. JONES.

Eagle of the toilless pinion,
Upward to thine eyrie hie,
Mid the crags where sounds the thunder,
With its hoarsest melody.

Emblem of the daring spirit,
When it wakes its latent might,
And for action doubly harnessed,
Battles sternly for the right.

Where the craven-hearted linger,
And desponds the gloomy soul,
There the brave at once join issue,
And relentless fate control.

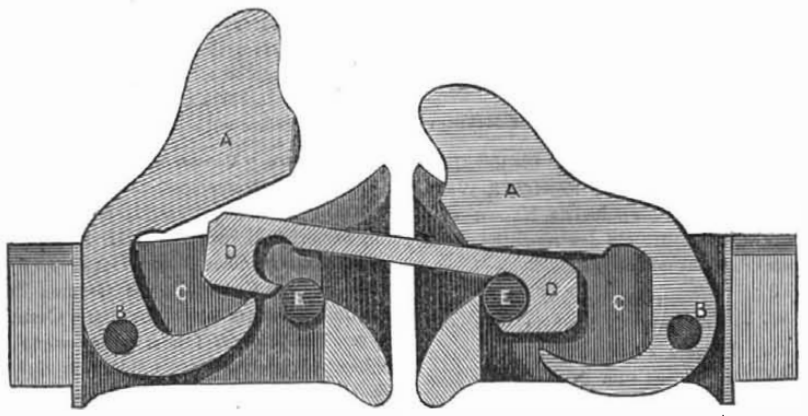
Who would warble out existence,
Like a song-bird in the bower,
Heedless that he has within him,
Elements of moral power ?

Breaking on the shore of being,
Who would as the wavelet die ?
When he could have won distinction,
With the single heart to try ?

Then be up, and dream no longer,
Manly purposes avow,
And with great designs accomplished,
Bind the chaplet to thy brow.

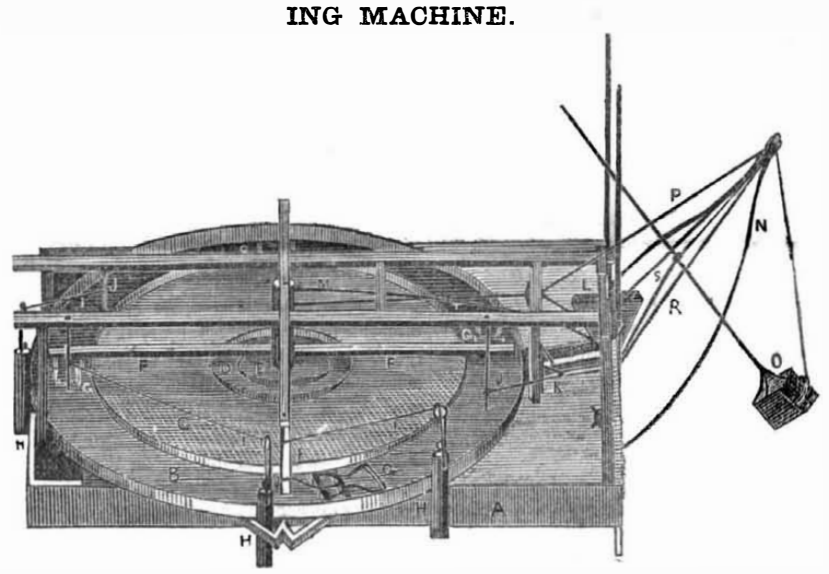
The amount of land heretofore granted to States by the General Government is 20,625,006 acres—of which 10,807,958 acres were for common schools.

IMPROVED RAILROAD CAR COUPLING.



This is an improved car coupling, invented by Mr. Joshua O. Lewis of Worcester, Mass. and it is a good one. This is a longitudinal section showing the inside of the coupling boxes, C C. A A, are two weighted levers that are made to vibrate on pins B B. D D, is a catch bar which unites the cars by hooking on the iron pins E E. The weighted levers A A, holds the catch bar firmly down and it cannot be raised without lifting up A, as represented at the left hand, when its lower end raises D, and allows the cars to uncouple easily. The cars however are self coupling—by pushing one backward or another forward, the catch bar will couple itself, but it cannot be drawn out without the top of A be lifted backwards. Any person, will be able to see its construction and operation by this engraving. Measures have been taken to secure a patent.

JAMES KNOX GLENN'S DREDGING AND GOLD WASHING MACHINE.



This apparatus is the invention of Mr. James Knox Glenn, recent Commissioner of the State of Ohio for deepening the Sandusky river, and who has made application for a patent for the same. It is invented for raising deposits of gold from the bottom of streams or rivers in California—a floating gold-washing establishment. It is simple and most effectual; and it is well known that the greatest quantities of gold are to be found in the bends of streams, but the difficulty has been heretofore, in the absence of an apparatus to lift and wash it.

This engraving is a perspective view of the apparatus. A is a scow or float, to support and float the machinery alone. B is a circular trough, about 5 feet wide and 18 inches deep, and it extends around the width of the scow. C is a tow-path where the horse or other power is applied to drive the shafts F F, which are radial levers bolted to a strong central vertical shaft E. This central shaft is secured by a vertical axis to the vessel below, and a vertical axis in the stationary frame of upright and transverse beams above. The soil to be washed, to separate the gold from it, is dumped by the dredge scoop O, into a hopper, and finds its way through a screen into the large trough B, where it is agitated by raker G, fixed on the radial levers. The trough is supplied with water by pumps H H, which extend down into the water, and the plungers are operated by suspended cam rods J, which are attached to the plungers of the pumps by chains T, I, passing over pulleys above the pumps. When the radial levers are moved round by the horses, the suspended cam rods are pushed forward and the plungers of the pumps lifted up, but they fall down by their own gravity. The rakes or drags G, are moved round and agitate the deposits in the large trough. The lighter particles are suspended in the water and washed over bye-washes at the sides, which are gates somewhat lower than the upper edge of the outside trough. When the gold is thoroughly washed, it is removed into the mercury trough D, and agitated with water the same way as the outside trough is operated, so as to produce amalgamation between the two metals, when they are afterwards separated by the well-known methods.

L is the hopper, with the screen underneath and below it. It receives a shaking motion by being attached to a toggle lever C, which is struck alternately by the radial levers moving round, and thus shakes the deposit soil down into the trough C. The coarse particles, small stones, &c. are thrown out of the screen at the side and do not get into the trough. O, the dredge or lever scoop, is suspended and operated by a swinging frame composed of two angular levers N, working on axles on the end of the scow A, and is elevated and lowered by chains or ropes passing over pulleys which will be observed at the right hand of the figure. P is a rope or chain attached to the scoop passing over a grooved sheave between the ends of the angular levers and passes along around a capstan drum M, on the main vertical shaft. This drum can be thrown in and out of gear with a clutch on the lower part of it, operated by a lever, so as to let the scoop O, when full, be raised by the horse power, or steam or other power, that may be applied to the radial levers. The scoop can be made to dredge at any angle, and it can be drawn in and thrust out from the side of the vessel to take a long sweep by a double rope R, passing over a sheave between the ends of the angular levers and operated by the windlass seen at this side. On the other side is a windlass which lifts up the frame by chains, secured to the end of the frame and passing from the windlass up over a pulley above for the greater lever power.

At the end of the scow are two vertical anchor stakes, to be driven into the bottom of the stream, and they can be elevated by the rope P, passing around the capstan drum. For further information see the inventor's Card of reference on the advertising page.

RAILROAD NEWS.

Ohio, Mississippi, St. Louis and Lake Erie Railroads.

Two great railroad routes are now dividing the favor of the people of the northwestern States, one from Cincinnati to St. Louis, thro' Lawrenceburgh and Vincennes, the other, taking a more northerly course, from St. Louis through Terre Haute and Indianopolis to Lake Erie. The citizens of Cincinnati are most earnest to secure a preference for the southern route. As surveyed between St. Louis and Cincinnati, it is 360 miles in length.

The citizens of Cincinnati are in favor of the road and the city corporation will subscribe $500,000; St. Louis has given a pledge to take the same sum. The counties along the line are petitioning their legislatures for permission to subscribe as counties for such amounts of stock as the voters shall decide on by election.

Baltimore and Ohio Railroad.

The Baltimore and Ohio Railroad Company is about to make a strenuous effort to push its road through from Cumberland to Wheeling. The trade upon its finished road has been unusually great this winter; Maryland State bonds, of which the Company holds $3,000,000, have improved ; and, in the Baltimore Patroit of the 14th instant, is an advertisement, signed by the President, setting forth that the Company are about to put under contract one hundred miles of their road west of Cumberland.

Mississippi River Railroad.

If a railroad (says the Augusta Chronicle) can be made from Mobile to the mouth of the Ohio river, and not be more than 550 miles in length, it will command an immense trade and travel. [The measured distance from this city to Cairo is 470 miles.] It is to be hoped that the commendable efforts of Alabamians to tap the business of the Upper Mississippi, may be successful. The exchanges that can be made between the products of the South and those of the North will be highly advantageous to the people of both sections. It is expected that railroads will soon be constructed from Cairo in Illinois, to Galena and Chicago.

The South Carolina Railroad from Charleston to Hamburg, is said to be in a bad condition : and its affairs much embarrassed. It is a part of the great line of travel between New Orleans and the North. As an effort to remedy the condition of things, the company have resolved to effect a total change in the administration of affairs.

The Buffalonians have started the proposition of carrying out some plan for the purpose of supplying the city with water. A meeting was lately held to discuss the point as to wheather this should be carried into effect by the corporation, or by a chartered company.

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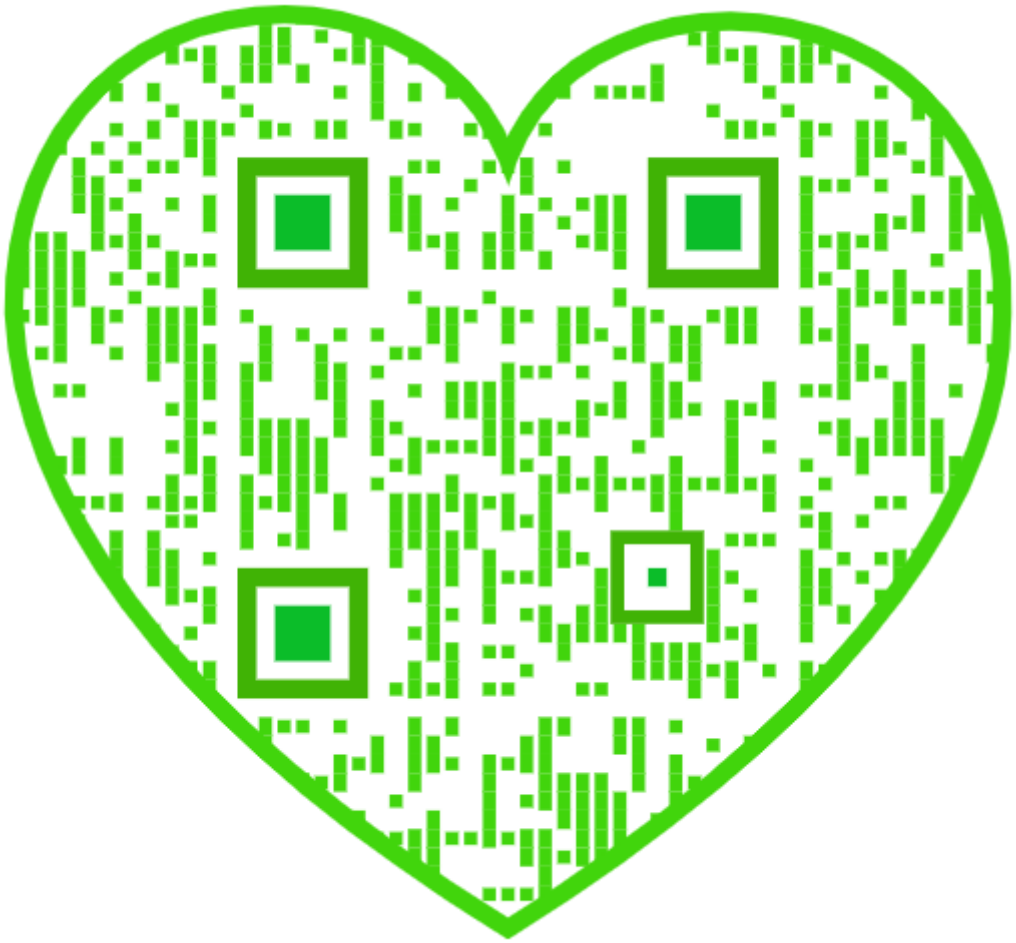

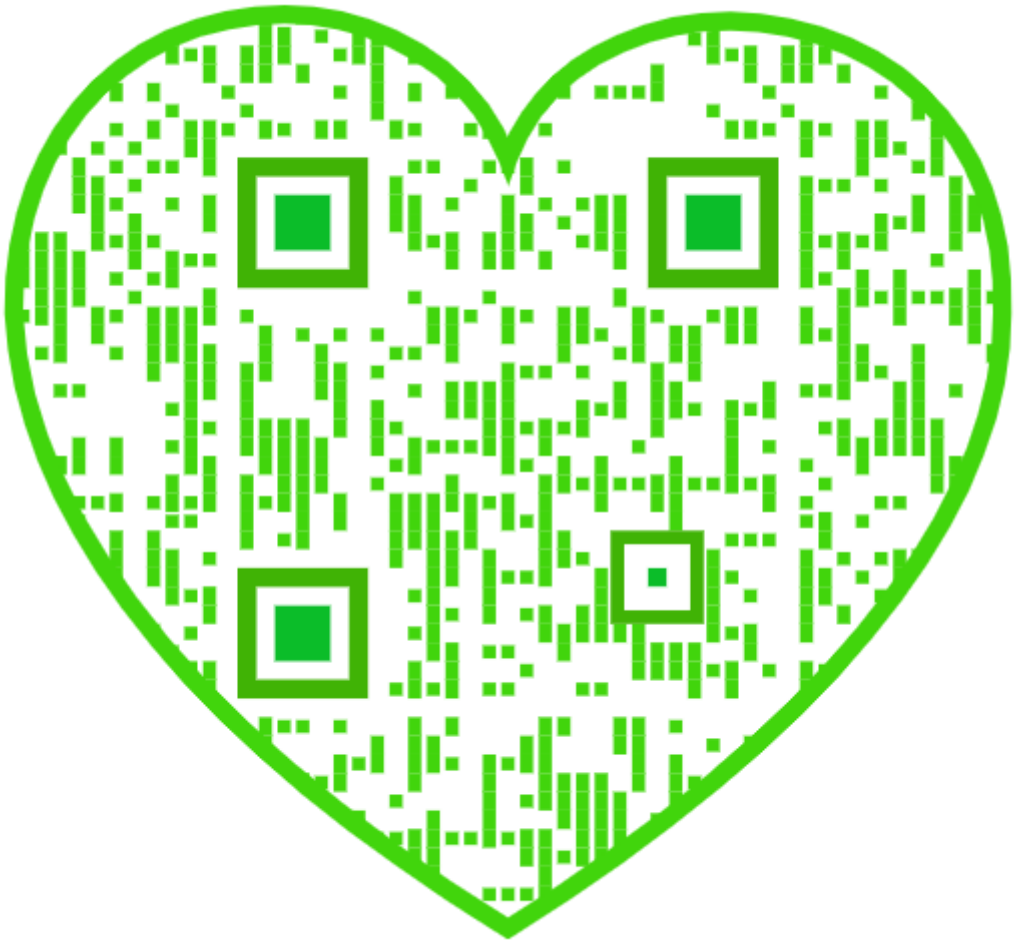

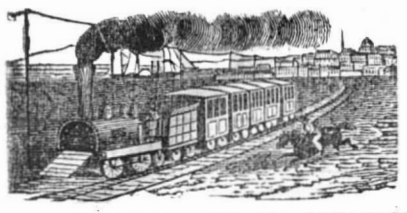

American Linen.

A very liberal charter has recently been granted by the Kentucky Legislature, for the manufacturing of Linen at Maysville, with a capital of $200,000, in shares of 100 dollars each, payable in calls of $10, not oftener than once in thirty days. The intention is to manufacture Linen of hemp, though flax may be used. Mason County, in which Maysville is situated is the first hemp growing county in the State, having produced in some seasons 3,000 tons. The soil near Maysville, both in Ohio and Kentucky, is admirably adapted to flax, and if a demand existed for it any quantity could be produced. The farmers in that section often grow flax for the seed only, cutting the straw with a scythe, which, after being threshed, is thrown away.

One quarter of the capital stock is reserved for such of the hands as choose to purchase, making them, so far as their purchase extends, partners in the establishment. We commend this provision to all manufacturing companies, as an appropriate means of securing the care and faithfulness of the operatives, and as a very sure means of elevating them. Will it not do away with that antagonism which so frequently exists between employers and employed, to the injury of both parties ? Some persons from Ireland and Scotland, who have had experience in manufacturing linen of hemp, are expected to engage in this Maysville enterprise.

America can be if she chooses, the greatest linen as well as the greatest cotton manufacturing country in the world—and what fabric can equal fine linen.

Portsmouth N. H. Steam Factory.

During the past year about two millions three hundred thousand yards of lawns have been manufacturing at this mill. The product of October, Nov. and December, was about 675,000 yards, which is at the rate of 2,700,000 per year—200,000 more than the highest estimates of the product of the mill. And while the amount of yards manufactured has been much increased, the expense of coal has been reduced about fifty per cent, for the last half-year.

Mammoth Mining Company.

One branch of the Missouri Legislature has passed a bill to incorporate the Mammoth Mining Company. This bill incorporates a Company with a capital of $400,000, for the purpose of mining, smelting, and manufacturing ores, minerals and metals in the Counties of Jefferson, Washington and Franklin. This Company will be the owners of the mammoth lead mines in Jefferson Co. and other valuable mineral lands, and a heavy capital will be put into useful operation in those counties.

The Late Locomotive Explosion.

The commission consisting of Isaac Adams, Holmes Hinkley, Gardner P. Drury, Jabez Coney, Lewis Kirk, Wilson Eddy, John B. Winslow and Seth Adams, requested to examine into the causes of the recent explosion of a locomotive boiler on the Boston and Providence Railroad, have reported that the evidence in the case is clear and there was very little, if any, water in the boiler at the moment of the accident, and give it as their mature opinion that the explosion took place from over-heating the boiler, in consequence of a want of water.

Another Boiler Explosion.

At Alston, Illinois, the steam boilers attached to the steam mills of Messrs. Burrows & Co. exploded recently, killing the fireman and wounding several others in the establishment. One of the boilers was literally torn to pieces and a large portion of it thrown into the middle of the street ; the other boiler was thrown against the main building, making a large breach in the solid wall. Fragments of the ruin were strewn thick upon every hand, and yet no serious injury occurred to any persons out of the mill.

LITERARY NOTICES.

Ranlett's Architect.

No. 6, of vol. 2 of this splendid work has been issued by Dewitt & Davenport, Tribune Buildings. Like its predecessors, it combines the beautiful, ornamental and useful in the designs presented, mainly with a view to elevate the architectural taste of our people and at the same time not overlooking those things which tend to the comfort of body as well as pleasure of soul. In this number there are two designs of cottages in the Anglo Norman style, with perspective and sectional views of the same, also full specifications and an estimate of the expense.

Lectures on the Philosophy of Mesmerism.

This is a neat little work by the Rev. John Bover Dods, published by Fowlers & Wells, the well known Phrenologists, Nassau st.—It treats of the nature and describes the whole process of animal magnetism.

Tobacco.

In the city of New York alone, the consumption of cigars is computed at ten thousand dollars a day—a sum greater than that which the inhabitants pay for their daily bread ; and, in the whole country, the annual consumption of tobacco is estimated at one hundred thousand lbs., being seven pounds to every man, woman and child, at an annual cost to the consumers of twenty million dollars.

In 1840, it was ascertained by a committee appointed to procure and report statistical information on the subject, that above one million five hundred thousand persons were engaged in the manufacture and cultivation of tobacco in the United States—one million of whom were in the States of Virginia, Maryland, Kentucky and Missouri. Allowing the population of the whole country to be seventeen millions, it will be seen that nearly one-tenth are in some way engaged in the cultivation or manufacture of this article. The value of the export during the year was nearly ten million dollars.

In 1690, the Pope excommunicated all those who took tobacco and snuff.

Early Tomatoes.

When the assistance of a hot bed cannot be obtained, tomatoes may be successfully started in pots, or other suitable vessels, in a warm room. In this manner the maturation of the fruit will be advanced a week or two and without involving any serious trouble or expense.

"While the fruit remains green," says a recent writer on the management of tomatoes "I have much facilitated the ripening by removing the large leaves from dense branches of fruit, and placing white boards behind them, so as to reflect the sun's rays strongly upon them. With the same view, an English author of eminence, recommends tin.

The British fruit raisers consider a good wall for fruit, equal to an advance of six degrees toward the equator. By planting the tomato in beds under a fence brilliantly whitewashed, or painted white, maturation of the fruit would no doubt be materially advanced. Frequent and copious irrigation with soapsuds and cleanly cultivation, greatly facilitates the development of this fruit.

To Cure Stammering.

First.—Commence speaking while the breath is going out, and speak very slow. The stammerer always attempts to speak while drawin the breath, and cannot succeed until he begins to respire, or the breath is going out.

Second.—Place the tongue flat on the bottom of the mouth, before attempting to speak, for the tongue of the stammerer inclines to the roof of the mouth, and there adheres, while he is striving to speak by drawing in the breath, but is disappointed.

Third.—Begin by attempting short sentences and easy words ; as the Lord's Prayer, and commence by placing the tongue on the bottom of the mouth.

Fourth.—The operator may commence with easy words to pronounce, and then proceed to hard words.

A bill has been reported in our Legislature to abolish stone cutting at Sing Sing State Prison.

Increase of Gold and its Effect on Value.

The Liverpool Journal says that the annual addition to the stock of gold made by mines is about £12,000,000, of which Russia and South America contribute each £5,000,000. The Russian mines have been worked about twelve years, and have enlarged our stock of gold by £60,000,000, without having produced the least effect in price. The effect of the discovery of gold in California, it thinks, will be to close many of the South American works, and this may extend even to Russia, so that the average aggregate supply will be less than is generally supposed, and, as the stock in existence is estimated at £800,000,000, the addition of £26,000,000 annually could not essentially interfere with its value.

The "United States."

This gallant steamer, which was so severely tried in her last trip, has just been disposed of by her original owners, C. H. Marshall & Co. She was purchased by Mr. Auguste Belmont, Austrian Consul, for the German Empire, and is to form a part of the new German Navy. The price paid for her, according to the best information we can obtain, is $275,000. This is a considerable sacrifice to the owners, as she has run herself in debt about $50,000, and cost originally about $300,000.

British Trade in Luxuries.

The imports into London from the commencement of the season to Jan. 22, amounted to 10,000 tons. A great increase is said to be going on in the manufacturing districts, as is shewn by the clearances at London and Liverpool for home consumption. The consumption of currants in the United Kingdom in 1846, was 18,000 tons, the highest point it had ever reached. In 1847 it was less. In 1848, the estimate is, that it will exceed 19,000 tons. Of raisins, the consumption in 11 months of 1848, was 9,000 tons. Of prunes, 600 tons were cleared at London and Liverpool during the last four months of 1848.

Congressional Library.

The total number of volumes in this Library is rated at 45,000, and though not one of the largest in the country, the library is unquestionably one of the most select and truly valuable. The rooms of the Congressional Library, as now arranged, are crowded to the utmost capacity. The Library is undoubtedly one of the most attractive places in the metropolis, for strangers as well as scholars, to visit, and during the sessions of Congress it is open every week day, from nine o'clock until the two Houses adjourn for the day, and when Congress is not in session it is open to the public three days in the week.

Steam Vessels of the British Navy.

The steam vessels in the British navy, of all classes, amount in number to one hundred and eighty one. Their steam power ranges from 20 to 800 horses, and the number of guns carried ranges from 1 to 80 each. This list includes several of their frigates and line of battle ships that have been converted into auxillary steamers, and, also, thirty one still on the stocks, and does not include any of the numerous mail packets that can at any moment be pressed into service.

Improvement at South Hadley Falls.

The new Paper Mill at South Hadley Falls is completed, and commenced the manufacture of writing paper last week.

The large and beautiful structure, at the same place, called the "Glasgow Mill," will soon be ready for operation in the manufacture of a certain kind of cotton fabric. The mill is to be lighted with gas, made in the basement of the building.

A Good Shot.

Gen. Shields was shot through the breast at Cerro Gordo, and now takes the place of Judge Breese, in the U. S. Senate. This has given raise to the following good thing by a Sucker wag :

Some men have "lost their heads" and lived,
But stranger far than these,
The shot that pass'd through Shields' breast,
Instead of him, killed Breese.

The Grand Jury of Wayne Co., Michigan have petitioned for the re-enactment of the death penalty, owing to the increase of capital crime since the penalty was abolished.

Algebra.

Mr. Jacob Haff, of Plumb Brook, Macomb, Co., Michigan, writing to the Tribune of this city says "I have discovered a mode of solving Cubic Equations, which is almost as simple as the extraction of the Cube Root, in arithmetic ; and I believe the mode may be successfully and advantagously applied to all the higher equations. If any person wishing a sample of this mode of solving Cubics will signify his wishes to me by mail, (post paid) I will send him a solution. I should choose to have the applicant select an equation—one from the class denominated "Irreducible," if he pleases."

New Mode of Fishing.

The Watertown (Wis.) Chronicle says: The fishing at Beaver Dam continues as good as ever. Tons of the finest pickerel have this winter been taken there. At an air hole in the ice, a few miles above the village, fish are taken in large quantities with common pitch fork! Incredible as this may appear, it is nevertheless true. One man, the other day, caught a cord of fish in this way, in the course of a few hours.

Remarkable Case of Recovery from Insanity.

A man (says the Boston Traveller) who has for the last forty years been confined as a raving maniac in the Poor House at Newton, has been suddenly restored to his senses. He has been regarded as incurable, and for a great part of the time during his confinement he has been so violent as to render it necessary to chain him. He appears like one awakened from a long sleep and remembering distinctly events which occurred previous to the loss of his reason, but nothing that has transpired during the long years of his confinement.

The Copper and Gold Regions.

Jonathan Carver, who traversed the North-West in 1777, wrote a history of it. He was not able to get it published in this country, as his statements were considered visionary.—It was done in London, but was not credited. His notice of the existence of an abundance of copper on Lake Superior, has proved true. His remarks in relation to California we are getting daily evidence of. We never heard of an American edition of the work being published. Probably but few copies of the work are now to be found.

Fire at Oswego.

The large starch factory at Oswego has been destroyed by fire. The factory turned out four or five tons of starch per day, and had a capital of $100,000. It was owned by stockholders residing at Oswego and Auburn.

An Artist's Loss.

Mr. Carbella, the Italian artist, has lost about $6000 worth of paintings by the late fire in Hartford, Conn. This is a painful loss, as some of the paintings were splendid, and he is now old and less able to buffet with the tempest of life for a livelihood.

Growth of London.

It is estimated, says the New York Herald, that more buildings have been erected in London for the past year, than the city of New York now contains.

A Great Machine Shop.

The Lowell, Mass., Machine Shop can furnish machinery complete for a mill of 600 spindles, in three months, and a mill can be built in the same time.

No arrangements (as heretofore reported) have een made to run the Cunard line of steamers direct between New York and Liverpool.

A motion has been introduced into our Legislature to convert the Clinton Co. State Prison into an Insane Asylum.

It is rumored that a new steam ship line is about to be established between this city and the city of Glasgow, Scotland.

They are talking in London about establishing a balloon railway to California.

By the last steamer we learn that the Pope is still at Gaeta.

The cholera is decreasing in Britain and trade it getting better.

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For the Scientific American.

The Mineralogist.—The description and locality of every important Mineral in the United States.

(*Continued.*)

ANTIMONY, SULPHURET OF.

Occurs in compact delicate threads. Color, lead gray. Lustre, shining. Yields to the knife; brittle. Melts in a candle. 4 times as heavy as water. Found at Harwinton, Ct.; on Saco river, Me.; near Richmond, Va.; Zanesville, Ohio; South Hadley, Mass. This is the ore from which the metal is extracted

APATILE.

Colors, white, greenish, blue, bluish green, reddish, and yellowish white. Lustre, glassy; nearly transparent; yields to the knife. Does not melt; dissolves in acids. Occurs at Hamilton and Germantown, Pa.; Milford hills, Ct.; Topsham, Me.; in the vicinities of Wilmington, Del.; Crown Point, New York, West Farms, Green Pond (Morris Co.,) Anthony's Nose, in the Highlands, N. Y.; Baltimore, Md.; Philadelphia and New Haven.

ARGENTINE.

Occurs in thin plates. Color, milk white, reddish or grayish white. Lustre, pearly. Nearly transparent. Yields to the knife; easily broken. Does not melt. Dissolves in acids with bubbling and heat. Found at the Southhampton lead mine, and Williamsburg, Mass.; Franconia, N. H.

ARGILLACEOUS OXIDE OF IRON, [COLUMNAR.]

Occurs massive, composed of columns, like starch. Colors, red, brownish, yellowish, or blackish red. Fine grained; earthy; brittle; adheres to the tongue; 3 to 4 times heavier than water. Found at Martha's Vineyard, Mass.; Navesink hills, N. J.; Long Island, N. Y.

ARGILLACEOUS OXIDE OF IRON [LENTICULAR.]

Occurs in flat, lens-like masses. Color, brown or red. Easily broken; 3 times heavier than water. Becomes magnetic when heated, but does not easily melt. Found at Ontario, N. Y., in sand, gravel, clay, &c.

ARGILLACEOUS OXIDE OF IRON, [NODULAR.]

Occurs in balls of a yellow or yellowish brown color. Scarcely yields to the knife; 3 times heavier than water. Found extensively at Bomb-shell hill, Md. When heated strongly it explodes. Also near Baltimore, Md.; Plymouth, Mass.; and Northington, Ct.

ARGILLACEOUS OXIDE OF IRON, [PISIFORM.]

Occurs in masses resembling peas Color, brown. Lustre, at the surface resinous; in the centre, dull. Brittle. Found in Salisbury, Windsor, and Hartford, Ct.; Pompton plain, N. J.; Staten Island, N. Y.

ARRAGONITE.

Color, white, yellowish white, greenish gray, pearl gray. Lustre, glassy; scratches marble. On a red hot iron, it shines in the dark. Dissolves in acids. Appears to consist of bundles of small crystals. Found at Weir's cave, Va.; and Suckasunny mine, N. J.

ARSENIATE OF COBALT.

Occurs in masses resembling a bunch of grapes, also kidney-form, and in crusts, with needle-like crystals. Crystals, transparent. Soft; readily bends. Nearly 3 times heavier than water When heated, emits the odor of garlic, and tinges borax smalt blue. Color, peach blossom red. Occurs in Chatham, Ct.

ARSENIC.

Occurs in plates, small masses, kidney-shaped, and resembling a cluster of grapes. Color, tin white, inclining to lead gray. Yields to the knife; brittle; lustre metallic; 5½ times heavier than water. Burns when heated, with a garlic odor, and soon goes off in vapor. It is found in Martha's Vineyard.

ARSENICAL NICKEL

Occurs massive, resembling a net or bunch of grapes. Color, red; tarnishes. Lustre, shining. Yields with difficulty to the knife. From 6 to 7 times heavier than water. When heated, gives out garlic odor. Forms a green solution in warm aqua fortis. Found in Chatham, Ct.; Frederick Co., Md.

(*To be continued.*)

Temper is Everything.

A friend of Mr Pitt introduced him at a very early age to Lord Mansfield, who, after conversing with him for some short time, on his departure asked his introducer—"What is the temper of your young friend?" "Under complete control." "Then," said Lord Mansfield, "he may rule the kingdom."

For the Scientific American.

Expansion of Steam.

The subject of the expansion of steam is so little understood by Practical Engineers that it is proposed in order to give a more clear understanding of the matter to investigate some of its principal features.

To him therefore who has not had time and money to go through a course of studies to qualify him for eminency in his profession is this writing particularly directed, and as the lives of those who travel by steam are for the time being in the hands of the engineer, and as anything tending to elevate him in his profession or character, would be a Public benefit, it is hoped the subject will not be uninteresting.

The meaning of the term "Expansion," is the act of expanding, being made larger, dilitation. A few examples will render the term more intelligible.

Suppose we take a bladder, fill it half full of air, and tie the mouth up tightly. Now on holding it to the fire, it will quickly commence distending, or get larger, and will go on increasing in size until it appears quite full, and such will in fact be the case, for the air, although not filling the bladder when cold, will on being heated expand and occupy the whole interior; we should then say, that this was owing to the expansion of air.

Second.—Take a tube, say of 8 inches in length and half an inch in diameter, let it be open at both ends and fitted with a piston so that the piston will move up or down without allowing air to pass its sides; the piston being pushed down to within one inch of the bottom. Place the finger over the bottom, now it will be evident that one inch by half of air will be confined in the tube. Still keeping the finger on the bottom, draw the piston up to the top, the effect will be that the one inch by half of air will expand and occupy 8 times the space it did before, and consequently will be 8 times as large. It will not be supposed for a moment, that the air will lie quietly at the bottom of the tube, such could not be the case, for common sense teaches us that where there is a vacuum the air will be constantly trying to gain admission and we certainly should by removing the piston from the enclosed air, create a vacuum if the air would be confined to the bottom of the tube; the moment the piston begins to move from the air, the air will follow it, and by the time the piston has arrived at the top of the tube the air will be there also; this is an accordance with natural laws, that when the air is strongest or most pressed, it will rush to where it is weakest or least pressed.

Third.—Take any vessel of a cubic foot capacity in the interior, put a cubic inch of water into it and place the whole over a fire. Now we can boil the water until it has all evaporated; after the water has all been converted to steam the steam would fill the whole interior of the vessel, we should then express ourselves by saying, that by applying heat we had expanded a cubic inch of water into a cubic foot of steam.

The examples cited will convey a proper meaning of the term Expansion.

The term Expansion Valve is not generally understood. Cut-off, would be a more appropriate phrase. Strictly speaking it is not an expansion valve, the valve has nothing to do with the expansion of the steam; the arrangements for cutting off are of various kinds, the principles however of all, no matter how simple or how complicated are the same, that is, the steam must enter through them at a certain time and may be cut off at any desired point. In the late improved cut off of F. E. Sickles the main steam valves are made to perform the operation of cut-off, and tracing out their principles and effects, we shall find that the valves are strictly and truly a cut off in every sense of the word, the arrangement is such that when the valve has opened the desired height it is tripped and falls again to its seat, thus cutting off a farther supply of steam and leaving what has passed through it, to undergo expansion in the cylinder.

Now to illustrate more fully the expansion of Steam in the steam engine, suppose we have a cylinder of 8 feet stroke and a constant pressure of steam of 16 lbs. to the square inch of area, it is immaterial at present what the diameter shall be. Suppose again the cylinder divided in the direction of its length into 8 equal parts, and that the steam is cut off where the piston has travelled one of these divisions, the steam being admitted at a pressure of 16 lbs will exert that force from the commencement of the stroke until it is cut off at the first division. Now if the piston was stopped at this point we should have 1-8 of a cylinder of steam of the pressure of 16 lbs. to the inch area, but the piston still continuing on to the second division, must make twice the room in the cylinder there was before, and the steam instead of being confined to the one division, would expand or increase in volume on dilate until it occupied the whole space made for it by the moving piston, and as the piston has by moving made double the room for it there was in the first instance it will of course be double the size it was while confined to one division, but in thus increasing to double volume the pressure will be decreased in like proportion, that is if the initial pressure be 16 lbs. on the piston's arrival at the second division the pressure would be 8 lbs., and could we suddenly arrest the piston at the latter division and make a hole in the cylinder for the steam to escape we should find that it would issue with the above force. The piston continuing on to the third division has made another equal space for the steam to occupy which it will again do by expanding, still filling up the three divisions but as before in expanding thus to fill the third space it will lose another portion of its pressure, and as the one division of steam now occupies three times the space it did at first it will only retain a third of its initial pressure which would be 5 1-3 lbs. the other 10 1-3 lbs. having expanded into the increased space in the cylinder. The piston on arriving at the fourth division will have added another space for the expansion of the steam, and as before in expanding into the space it will lose another equal portion of its pressure, for it has now increased to four times its first size, has lost twelve pounds of its pressure leaving 4 lbs. in the cylinder, that is, the steam that entered the cylinder at 16 lbs. pressure at the commencement of the stroke has now only one fourth of that pressure, when the piston has travelled to the fifth division the pressure will be 3 1-5 lbs. the other 12 and 4-5 lbs. having expanded, at the sixth division, pressure 2 2-3 lbs., 13 1-3 lbs. expansion, at the seventh division, pressure 2 7-25 lbs., 13 18-25 expanded, and at the last division or end of the stroke, pressure 2 lbs., 14lbs. expanded.

To be continued.

Working in Brass.

Brass moulding is carried on by means of two distinct kinds of moulds, namely, earthen or sand, and metal moulds; we shall now enter upon the investigation of the former of the two. The formation of earthen moulds requires long practical experience to overcome the disadvantages attendant upon the material used. The moulds must be sufficiently strong to withstand the action of the fluid metal perfectly, and at the same time must be so far pervious to air as to permit of the egress of the gases formed by the action of the metal on the sand If the material were perfectly air-tight, then damage would often ensue from the pressure arising from the rapidity of the generation of the gases, which would spoil the effect of the casting, and probably do serious injury to the operator. If the gases are locked up within the mould, the surface becomes filled with bubbles of air, rendering its texture porous and weak, besides injuring its appearance.

Sand mixed with clay or loam, is used for brass and other alloys. In the formation of brass moulds, old damp sand is principally used, in preference to the fresh material, being much less adhesive, and allowing the patterns to leave the moulds easier and cleaner.

Meal dust, or flour, is used for facing the moulds of small articles, but for large works, powdered chalk, wood ashes, &c., are used, as being more economical. If particularly fine work is required, a facing of charcoal or rottenstone, is applied Another plan for giving a fine surface, is to dry the moulds over a slow fire of cork shavings, or other carbonaceous substance, which deposits a fine thin coating of carbon. As regards the proportions of sand and loam used in the formation of the moulds, it is to be remarked that the greater the quantity of the former material, the more easily will the gases escape, and the less likelihood is there of a failure of the casting; on the other hand, if the latter substance predominates, the impression of the pattern will be better; but a far greater liability of injury to the casting will be incurred from the impermeable nature of the moulding material.

For some works, where easily fusible metal is used, metallic moulds are adopted. Thus, where great quantities of one particular species of casting is required, the metallic mould is cheaper, easier of management, and possesses the advantage of producing any number of exactly similar copies, such as casting bullets; printing types, and various other articles composed of the easily fusible metals, or their compounds, are moulded on the same principle. The pewterer generally uses brass moulds; they are heated previous to pouring in the metal. In order to cause the casting to leave the mould easier, as well as to give a finer face to the article, the mould is brushed thinly over with red ochre and white of egg. The founder finds that the proper time for pouring the metal, is indicated by the wasting of the zinc, which gives off a lambent flame from the surface of the melted metal. The moment this is observed, the crucible is to be removed from the fire, in order to avoid incurring a great waste of this volatile substance. Previous to raising the crucible, the molten brass is skimmed and then immediately poured. The best temperature for pouring, is that at which it will take the sharpest impression, and yet cool quickly. If the metal is very hot, and remains long in contact with the mould, what is called sand-burning takes place, and the face of the casting is injured. The founder then must rely on his own judgment, as to what is the lowest heat at which good sharp impressions will be produced; as a rule, the smallest and thinnest castings must be cast the first.

Complex objects, when inflamable, are occasionally moulded in brass, and some other of the fusible metals, by an extremely ingenious process. The mould is to be composed of some inflamable material, is to be placed in the sand flask, and the moulding sand is thrown in gradually until the box is filled up—when dry, the whole is placed in an oven, sufficiently hot to reduce the mould to ashes, which are easily removed from their hollow, when the metal may be poured in. In this way, small animals, birds, or vegetables, may be cast with the greatest facility. The animal is to be fixed in an empty moulding box, being held in the exact position required, by suitable wires or strings, which may be burnt or removed previous to pouring in the metal. Another mode, answers perfectly, when the original model is moulded in wax. This model is placed in the moulding-box in the manner detailed in the last process, having an additional piece of wax attached to represent the runner for the metal. The composition here used for moulding is 2 parts brickdust, to one of Plaster of Paris; this is mixed with water and poured in, so as to surround the model well. The whole is then slowly dried, and when the mould is sufficiently hardened to withstand the effects of the molten wax, it is warmed, in order to liquify and pour it out. When clear of the wax, the mould is dried, and buried in sand, in order to sustain it against the action of the fluid metal.

Apples for Food.

There is probably no one species of fruit, that is on the whole so valuable as the apple of our own native soil. Not a few persons entertain the idea that fruit for the invalid is unwholesome. This is an error arising probably from its injuring the health at times when mixed with other ingredients which are to the system of a rebellious nature. Most of those who can bear food upon the stomach at all, can bear apples in a proper quantity.

A boot-maker of Ognaçoke, Illinois, exhibits *eight* pairs of large size boots, made by a man named Grinnell, in one day.

There is a great reduction contemplated in the expenses of the British Government—time for it.

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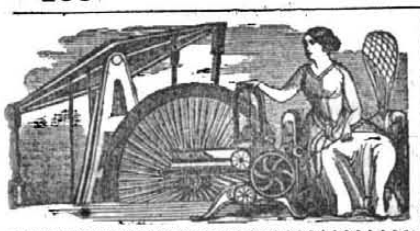


New Inventions.

Improved Dredging Steamboat.

Mr. James Callaghan of New Bedford, Mass. whose name lately appeared in our list of patents " for an improvement in Dredging Machines," has secured in his invention a very important point in dredging and removing obstructions to navigation in rivers. He employs a vertical sliding frame in front in combination with a movable angular side frame or levers, so as to enable the scoops to dredge at any angle or in a straight line, or very easily at any depth, and what is very important, with a rotary motion of the buckets, he exerts a lever power in excavating equal to the lever power by the lever scoop on the old reciprocating plan. The whole is so arranged that any number of buckets from one to twenty can be managed with ease at the same time in two separate divisions, and acting independently of each other, discharging their contents once in a minute.

Mr. Callaghan intends to construct his boat otherwise in the most approved manner combining the qualities of a steam and dredge boat in the same hull, and the steam power employed in excavating purposes may be readily applied to the propulsion of the boat, thereby avoiding the usual expense of towage. He has also made one capital improvement on the *mud* tender—a model of which we have seen, and for which a patent will soon be granted.

Improved Horse Power.

Mr. H. W. Bertholf, of Sugar Loaf, in this state, has made a valuable improvement on a stationary Horse Power machine, which is so simple and easily constructed, that almost every farmer can put it up himself. It is constructed with a main horizontal revolving shaft which is driven by levers to which the horses are attached moving in a circle and communicating the power by a chain from a large notched pulley above, to drive a thrasher, or any other machine, so essential now to a well managed farm. This Horse Power, has no cog wheels—no traction wheels or pulleys—it is all made of wood but the journals, and it is therefore capable of being repared by any of our farmers, all of whom are more or loss handy with the axe, saw, chisel and plane.

New Propeller.

Messrs. Wilder & Gooding, of Detroit, Michigan, have made an improvement in propelling by paddles, which are guided by slides to enter the water at an angle of about 45 degrees and rise in a vertical position. The paddles are operated by cranks on the end of the driving shaft and only three are used on each side. We have seen paddles driven by cranks to enter the water in nearly the same way before, but none that combined the principle of a vertical oar, which these do. It is an improvement on John Fitch's invention, and it possesses qualities, in which his was really defective. We hope this invention will be fairly tried.

Improvement in Machinery for Making Ropes.

Mr. Henry A. Clum, of Walworth, in this state. has just made application for a patent for improvements on machinery for making ropes, by which the rope walk is not only dispensed with in a very effectual manner, but the combination of the machine for short twisting and finishing is rendered so simple, that it must eventually supersede every other heretofore proposed for that purpose.

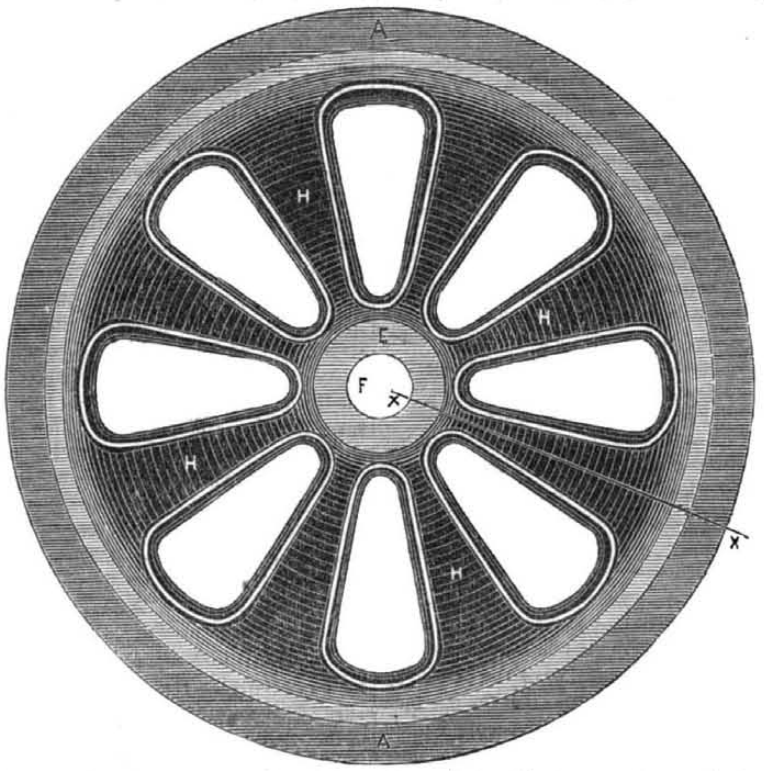
New Cotton Gin Saw Filer.

Mr. Israel F. Brown, of Columbus, Geo. has invented a new apparatus possessing much ingenuity, for filing Gin Saws. It is so constructed and arranged as to give alternately a rotary motion to the saw and a horizontal motion to the file and operating with the utmost exactness. One of these machines can accomplish the work of six men and does the work better than by hand.

Improvement on Thayer's Truss Bridge.

Mr. George W. Thayer of Springfield, Mass. has made a valuable improvement on his Truss Bridge, an engraving and description of which was published in No. 24, vol. 2 Scientific American. The improvement consists in combining a *double arch brace* with the frame of the bridge, by tension rods, so as to direct all centre pressure to the abutments.—The arch brace is therefore hung in the abutments about six feet below the bottom of the bridge, and the truss is kept firmly in its place hy the counter brace running through the upper and lower chords, locked and firmly bolted. The horizontal rods that run through the suspended parts are secured by nuts and screws and so are the *arch brace* tension rods, therefore by screwing up these at the same time, all the joints are kept firm and snug and the truss thus kept most effectually from sagging or settling in any part.

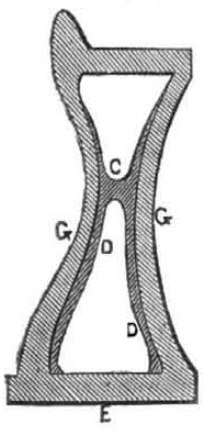
IMPROVED ARM CAR WHEELS.---Figure 1.



The improvement made on this wheel, is the invention of Albert T. Converse and Wm. T. Cooley, of Norwich, Conn. The form of the wheel is beautiful and exhibits much taste, making it a desirable wheel for passenger cars especially, both on account of its ornamental character and owing to another quality which it possesses over the plate wheels in use, viz. it has not that disagreeable humming peculiar to those wheels spoken of.

Fig. 1 is a side elevation, and fig. 2 a section of the wheel divided at the line X. The improvement consists in making the wheel with a solid hub having two sets of arms placed in such a position that their insides are nearly parallel with and form part of the sides of the wheel The position of the arms are at right angles with those usually employed, and they thereby obviate the important objection made heretofore against arm wheels, as their surface is more uniformly chilled on the tread of the wheel, which could not be obtained with the arms made transversely to the

FIG. 2.



inside of the rim, because the portion of the tread opposite the end of the arms was to a certain extent annealed by the greater thickness of metal at those parts—a moulder will understand this. The strength of the wheel is increased by uniting the arms on opposite sides to one another by ties C, as seen in the section fig. 2. A, is the flange or rim. H H, are the arms, of which there are 8 on each side—(double arms) connected by the tie C. E, is the hub, which is made without the divisions necessary in casting other armed wheels. G G, shows a longitudinal section through the arms, and D D, are braces cast in the inside of the arms for greater strength.—The curves of the wheel will be perfectly understood by fig. 2. It is a capital form for strength—we know of no arm wheel to compare with it, and it is the result in all its parts of a great number of stern experiments, which resulted in the choice of such a wheel as being superior to every other form tried. This wheel is secured by a patent and is made at Mr. Converse's Phœnix Foundry, Norwich, Conn. of the best materials, the spaces being formed with dry sand core and every attention paid to the production of a wheel of a superexcellent quality.

California Inventions.

The Gold mania has excited the inventive organs of our inventors in a most wonderful manner. New Gold Washers are to be seen at every corner. New safety india rubber dresses to perserve the lives of the gold finders from shipwreck, and new india rubber hammocks on which some might sleep to California even on the water, were it not for the dangers of the voyage. In short the wonders of the gold are not more wonderful than the means that have sprung into existence to get it, and to go where it is. It is not impossible for some lucky individuals to make gold by the bushel from brass.

The Felloe Machine.

The Felloe machine illustrated and described in a late number (22), was incorrect in reference to the residence of the inventors. The inventors are Joseph and Levi Adams, Hadley, Mass., and L. H. Moore, Leverett, Mass.

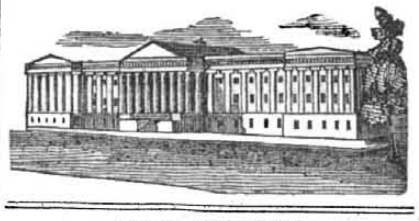
Detecting Gold by Weight.

Mr. Clark, of Chatham st., this city, has exhibited to us a newly invented machine for testing the presence of gold, which, in simplicity, is admirably adapted for transportation and use. The ore containing the precious metal is weighed with water, and a table gives, opposite the weight of the whole mass, the weight of the quantity of gold contained in it.

Improved Brad Awl.

Mr. John Gooding, jr. of Worcester, Mass., has made a very beautiful improvement on a Brad Awl, whereby it can be inserted and retained in the handle in a manner both ingenious and unique, making it a more valuable tool than it has hitherto been.

Water is only about eight times heavier than the atmosphere.



LIST OF PATENTS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending February 20, 1849.

To David Matthew, of Baltimore, Md., for improvement in Spark and Gas Consumers.—Patented Feb. 20, 1849.

To Wm. A. Edwards, of Clinton, Michigan, for improvement in the manufacture of Pearlash. Patented Feb. 20, 1849.

To Samuel Whitmarsh, of Northampton, Mass. for improvement in apparatus for warming apartments. Patented Feb. 20, 1849.

To N. E. Chaffee, of Ellington, Conn. for improvement in Drying Machines. Patented Feb. 20, 1849.

To Francis Grice, of Washington, D. C. for improved Block for supporting bilges and keels of vessels. Patented Feb. 20, 1849.

To Ransom Cook, of Plattsburgh, N. Y. for improvement in Electro Magnetic Ore Separator. Patented Feb. 20, 1849.

To B. F. Palmer, of Meredith, N. H. for improvement in Artificial Legs. Patented Feb. 20, 1849.

To S. H. Grinnell, of Charlestown, N. H. for improvement in Horse Rakes. Patented Feb. 20, 1849.

To Daniel Smith, of Scipio, N. Y., for improved attachment of loading Muzzle for Rifles. Patented Feb. 20, 1849.

To L. T. Cheever, of East Greenwich, R. I. for improvement in Fire Kindling Materials. Patented Feb. 20, 1849.

To J. D. Steel, of Pottstown, Pa., for improved method of attaching the Arch to the Truss Frame in Bridges. Batented Feb. 20, 1849.

To Valentine Roth, of Evansville, Ind. for improvement in Brick Presses. Patented Feb. 20, 1849.

To James Mullery, of Parkersburgh, Pa. for improvement in short Slide Valves by Chamfering the Corners Patented Feb. 20, 1849

To Washburn Rice, of Seneca Falls, N. Y. for improvement in self-acting Registers for Stoves. Patented Feb. 20, 1849.

To Wm. H. Lindsay, of New York City, for Fluid Metre. Patented Feb. 20, 1849.

To Samuel Huntington, of Middlefield, N. Y. for improvement in machinery for Turning right and left Lasts, &c. from the same pattern. Patented Feb. 20, 1849.

To James Secor, of St. Louis, Mo., for improvement in apparatus for Current Wheels.—Patented Feb. 20, 1849.

To Charles Murdock, of Baltimore, Md., for improvement in Churns. Patented Feb. 20, 1849.

To James M. Eddy, of Boston, Mass., for improvement in machinery for Turning Irregular Forms. Patented Feb. 20, 1849.

To Jeptha Dyson, of Fulton, S. C., for Improvements in Carding Engines. Patented Feb. 20, 1849.

To C. W. Buchel, of New York City, for improved Cartridge Tube and Conveyor forming a Repeating Fire Arm. Patented Feb. 20, 1849.

Electro Magnetism.

The attention of the public is specially directed at present to the employment of electro magnetism as a motive power. We have received a good communication on this subject, which will appear next week.

A Patent Case.

The case Childs vs. Wilson, came up again on the 24th inst. before Judge Kane at Philadelphia, on motion to attach the defendant for a violation of an injunction against him to prevent him using a patent process in the manufacturing of lamp black, invented by J. Mini and assigned to the complainant. Upon his promise to refrain from further infringement of the patent, he was discharged on payment of costs. The case has been before the Court several times before.

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NEW YORK, MARCH 3, 1849.

Things New and Old.

The field of discovery is a vast one. It is not confined to any age, or country, but it embraces all ages, and the whole universe. Inventors have existed in every era of the world's history, even from Tubal Cain to the person who has obtained the latest patent at Washington. The human mind, as an evidence of its divine origin, is ever on the rack to discover something new. It is nearly four thousand years since Noah built the first ship—that vessel which floated majestically upon the turbid waters of the Deluge, and yet the end of discovery in nautical science is not yet.—Every age has added improvements to this science, and to every other science and art also. It is true indeed that the works of the ancient masters of sculpture, painting and architecture, are not surpassed by any works of the present age, nor have any improvements been added to the grace and beauty of the ancient works of this kind, but for works of utility, such as the Croton Water Works of this city, the Menai Bridge in Wales, the Eddystone Lighthouse, and many other modern works, we more than excel the ancient masters of architecture. It cannot be denied, that "the progress of discovery" has been gradual; every age has added a stone to the pile and we need not wonder that similarly constituted minds, in different ages, have produced similar inventions. This would not be the case, if every man was particularly acquainted with all the labors of his predecessors. But this is an impossibility, hence we see, almost every week, some invention, not new to us, but new to the inventor. Owing to this fact we often give sketches of past discoveries and present the experience and reasoning of scientific men upon different subjects. Many new discoveries are made in science, but the fundamental principles of science change not,—those sciences we mean, that are founded on mathematics. This being true, and every few years bringing a new race upon the stage of time, we must present things new and old to our readers, for every new generation commences existence with a perfect ignorance of the past. The art of printing enables the student now to become acquainted with some kinds of knowledge in a few minutes, that cost a lifetime of labor and study to other people,—hence he that "would be wise and full of knowledge" must not be ignorant of things new and old.

The Travelling Balloon.

This ærial apparatus which has created such an excitement in our city lately, and was exhibited in the Tabernacle on Wednesday evening last week at twenty five cents a piece, was published in No. 4, vol. 1 Scientific American. Any of our readers who have that volume can turn to the number and see the engraving and description, corresponding in every part to the machine now before the public and which is to take passengers to California in three or four days for $100 dollars each. We have not said any thing about it before owing to the fact of its being before our readers for some years. The question now, is to see a large one going at the rate of 100 miles per hour as its inventors state it can do. The æriod is of the form of a cigar, or double *cone*, but it is called the *revoloidal* spindle by the inventors. They object to the name of balloon. The vessel to hold the gas is to be 800 feet long and 50 in diameter, and this is to be propelled by a four horse power engine at the rate of one hundred miles per hour to California, by driving two fan wheels of 20 feet diameter each and making 200 revolutions per minute, which will be each wheel passing through a space of 14,571 3-8 feet per minute. This ærial locomotive is to carry 100 passengers to California with all their baggage, to carry fuel and water for 48 hours, and to alight when necessary. It will be twice as long as the new mammoth steamer New World and nearly four times as long as the Constellation, now in the course of construction at Westervelt & Mackay's ship yard, which is 202 feet long—the largest merchant ship in existence. It is indeed a daring project to drive such a monster vessel through the air by a four horse power steam engine at the rate of 100 miles per hour. Just think of it—to see a vessel 800 feet long flying thro' the firmament to California, or to England, driven by a four horse power steam engine at a speed one third as fast as one of Hutton's bullets projected by 2 oz. of powder from a one-pounder gun. We saw the model, (which floated about two pounds) exhibited in the Tabernacle and were highly delighted with the amusement, although something went wrong with the machinery. We wish the inventors, Messrs. Porter & Robjohn, all success. We intend to put down our name for the *second* trip, and in reference to the next exhibition, we must say with Cowper,

"When Gilpin he does ride again,
May we be there to see."

Blanchard Gun Stock Turning Factory Case.

This case is renewed in Philadelphia for still further litigation. The Court granted an injunction against the Defendants on the fifth of January, and on the 22d February this order was made by the Court under a motion for an attachment against one of the Defendants for contempt in disobeying the injunction.

It is ordered, the counsel for the parties consenting; that William W. Hubbell, Esq., one of the counsellors of this Court, do inspect the machine or machines in use by the Respondent and the manner of operating therewith in the formation, manufacture and completing of lasts; and that he make report to this Court, of the form, character and mode of operating of the said machines, and of the results therefrom produced; and it is further ordered that the affidavits submitted at this hearing be inspected by him, and that copies thereof be made for his use (if he shall require the same) by the clerk of this Court,—and that the model or specimen attached to the said affidavits or some of them, or referred to therein, be placed in his custody,—and that the Respondent shall on reasonable notice give free access to Mr. Hubbell to the machine or machines in use by him, the Respondent, and that he moreover illustrate in the presence of Mr. Hubbell the mode of operating with such machines for the production of lasts like to the specimen or model in this order before referred to; and that the costs of the proceedings under this order do abide the event of the pending motion.

[When these cases are concluded we will give some of the evidence and other matters.

Pure Water in Albany.

F. S. Claxton, Esq. the engineer employed by the Common Council of Albany with the surveys preliminary to the introduction of a better supply of water into the capital of the Empire State, has reported in favor of the plan that has always appeared most favorable to us, viz. taking it from the Mohawk river. Mr. Claxton reports upon three sources of supply, viz. the Mohawk River, Patroon's Creek, and the Hudson. To supply the city from the Creek will cost, according to the estimate, $624,597; it is also supposed that this source will not yield enough for the city at the end of fifty years. The cost of raising and distributing the water of the Hudson is put down at 746,015; while the Mohawk water, taken at Cohoes, may be had for 703,899. These estimates suppose 1,000,000 gallons daily from the Hudson, 500,000 from the Creek, and 7,000,000 from the Mohawk.

An abundant supply of water by gravitation is the cheapest plan in the end, although it may be dearer at first. An instance of this kind has lately happened in Glasgow, Scotland, as a late exchange informs us, where a new supply of water is conveyed a distance of 10 miles from a small elevated lake. Now that place used to be supplied with water by steam engines where the fuel can be purchased for almost nothing, the kind used for the engines being only 50 cents per ton. We hope that the Albanians will conduct the Mohawk water for domestic purposes through good filtering reservoirs.

Steel and Gold Pens.

The earliest instruments used for writing were reeds, and they are still used in China and many other countries. It is not possible to tell when quills were first introduced—Some illuminated manuscripts of a very old date, represent the quill in the hand of the clerk. The Dutch were long famous for the manufacture of quills, the process of which was kept secret, but was carried to London by a Jew, and the quill business in England is still in the hands of that ancient people. The quill is now almost superseded by the steel pen, and the steel pen is in a great measure being superseded by the gold pen. The invention of the steel pen is not of an old date, but who the inventor was and the exact time when he invented it, is a piece of information which we have not, but would like to possess. All that we know about their origin is, that Mr. John Perry of London, was the first to give them elasticity by making slits in their sides. The manufacture of steel pens is now very extensive. The steel is rolled into very thin sheets about four inches broad and three feet long. They are placed successively under a stamping press and pieces of the proper form cut out with great rapidity. The nib is afterwards formed and likewise the slits in proper dies. The pens are then cleaned by being introduced—some thousands of them—into a tin cylinder, to which is communicated a violent motion by cranks, one to throw the pens up and down in one direction and the other to throw them up and down in the tin case in another direction—the tin case being hung like an eccentric. The pens are thus rubbed against one another and in three hours they are taken out bright and clean. They are afterwards tempered.

The Gold Pen is an American invention, said to have been invented by a clergyman, who communicated the idea to Mr. Browne of this city, who made the first gold pen in 1836. About two years ago, we were informed that a Mr. Smith in Saratoga Co. this State, had made a gold pen for his own use about twenty years ago, but we cannot speak positively on this point, although the information was received from a very creditable source.

In the manufacture of gold pens, the metal is first rolled out by machinery into thin strips the required thickness of the pen and then it is cut out by a die in pieces for the pens, of a form nearly like a pyramid erected on a square base. After this the work is all done by hand except rounding the channel by a die; and cutting the slit, which is a very scientific operation, performed in a way which few would suppose, and which is kept somewhat of a secret. The pens—the best—are pointed with Rhodium—not Irridium as has been commonly reported, and they are ground down in a peculiar manner to the writing point.—American gold pens are now manufactured and extensively used in London, and if we are indebted to England for the steel pen, we have returned the compliment. It is calculated that 1,200,000 gold pens were manufactured in this country in 1848, and more than 800 pounds of gold used in their manufacture, a high estimate no doubt, but very many gold cases and pens are now made. It is our opinion that an amalgum of gold and steel would make a super excellent pen. Very little gold would be required, as a small portion of that metal combined with iron, makes it anti-corrosive and no rhodium would be required for pointing.

The most extensive and famous manufacturers of gold pens in the world, is A. G. Bagley & Co., Broadway, this city. They have succeeded Mr. Brown, and Albert G. Bagley has been engaged in the manufacture from its very origin.

A few days ago we saw a gold pen made in the above manufactory for Gen. Taylor, (to write his inaugural address we suppose) which was a piece of the most tasteful and finished workmanship that ever came under our notice.

The navy appropriation bill which has passed the House of Representatives makes an appropriation of $10,000 for the construction at the National Observatory of a Magnetic Cloc under the superintendence of Dr. Locke, and to pay him for the free use, by the United States, of his invention of said clock and of all improvements he may make thereto.

Steamboats.—Their Management.

MR. EDITOR.—Having had some experience in nautical matters in my younger days, and having been a diligent observer of men and things since, I have often observed that the headway of our river steamers was very much retarded whenever it was desirable to change their course. The moving of the rudder either to the right or left, as the boat is passing through the water, produces a violent commotion in proportion as the angle formed by the keel and rudder is more or less acute.

It is also a well known fact that a vessel as long and flat as our river steamers, are not as obedient to their helm as shorter and sharper vessels. Many fearful collisions and disasters could be prevented if the course of the vessel could be changed with greater ease and rapidity. To avoid these objections a steamboat should be propelled by a double engine; that is, an engine with two pistons and cylinders, each piston driving a separate crank and wheel. The steam should be supplied from the main steam pipe by two branch pipes communicating with the two cylinders. In each branch pipe should be a valve, the valve rod passing through the upper deck to the stand occupied by the pilot, so that increasing or decreasing the speed of either wheel will produce a corresponding change in the course of the vessel and the use of the rudder be dispensed with; and by stopping or reversing one wheel the vessel may be brought about without loss of time and thus many dangers may be timely avoided.

Respectfully yours, GEORGE GUY.
Westford, N. Y. Feb. 20, 1849.

Electro Magaetism and Navigation.

Senator Benton has presented a memorial of Dr. Page to the U S. Senate, asking for the appointment of a committee to examine the merits of an invention for applying electro magnetism to the purposes of navigation and locomotion.

A committee of seven was appointed for the purpose. We hope that Dr. Page has got over the difficulties encountered by Davenport and Davidson, in their electro magnetic engines. If the power of electro magnetism can be concentrated by Dr. Page, like that of steam—it certainly is a more safe, clean and compact propelling agent than the other, and therefore will come into general use.

American Whaling Ships.

The Liverpool Times says:—"While the Americans have six or seven hundred ships engaged in whaling, the number of English vessels is reduced to seventeen. The Americans, by some mode or other, have quite superseded us in the adventurous and profitable business."

If the British want to get whales they must double Cape Horn, and not roll about Greenland.

The Prize Essay.

We have received a quite a number of essays on the Patent Laws, and they will be properly examined in due time. A reform in our Patent Laws is imperative. Of this we are convinced from the many facts that have recently come to our knowledge.

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Archimedes.

(*Continued from our last.*)

Archimedes appears, also to have had considerable skill in the science of optics. By a particular combination of mirrors, he is reported by historians to have burned either the whole, or part of the Roman fleet, during the siege of Syracuse. This achievement has been questioned by many modern philosophers, but whether it was actually performed or not, its practicability, at least, has been fully demonstrated by Buffon; and unless he had accomplished some such feat as this, it can scarcely be conceived how the report of it could have been so generally credited, particularly at a time when the world were strangers to the wonders of burning instruments.

Although the discoveries of Archimedes in mechanics were both splendid and triumphant yet, even they were eclipsed by those he made in the regions of pure science. And while Euclid had laid the foundation of geometry in his immaculate Elements, Archimedes raised the noble superstructure to a very high elevation, by the discovery of a series of propositions that constitute the most brilliant acquisitions of the ancients. In his Treatise on the properties of the cylinder and the sphere, he demonstrated this most beautiful theorem: That the superficial area, as well as the solid contents of every sphere, is equal to two thirds of that of its circumscribed cylinder. So justly enamoured was he of this admirable property of these solids, that he requested, that after his death, the figure of the cylinder, with its inscribed sphere, might be engraven on his tomb. And Cicero, during his quæstorship in Sicily, with that noble feeling of regard which true genius always inspires, and teaches to be due to merit though of a different kind, ordered the tombstone of the philosopher to be sought out, and cleared from the rubbish that concealed it from the eyes of the world.

Archimedes was the first who approximated to the rectification and quadrature of the circle, a problem which has exercised the ingenuity of mathematicians in all ages, and one which seems destined, from the nature of the inquiry, never to be be perfectly accomplished. In his book on the Measure of the Circle he demonstrates the following theorem, which is of the greatest practical utility: That the area of a circle is equal to that of a triangle whose base is equal to the circumference, perpendicular equal to the radius. He also proved, That if the diameter of a circle be reckoned unity, the circumference will be between 3 10-70 and 3 10-71. The method by which Archimedes arrived at this conclusion, is one of the finest specimens of human ingenuity and is capable of carrying the approximation to the exact circumference to any degree of accuracy required. This method, which is denominated the Method of Exhaustions, contains in it the germ of all the modern discoveries, and was capable of being applied to the investigation of problems, for which even the genius of Newton found it necessary to invent a new Calculi.

In his work on Conoids and Spheroids, he has unfolded many profound and ingenious properties of these solids, and their relations to cylinders and cones of the same altitude.—He was the first that ever found the complete quadrature of a curve, by demonstrating, That the area of the parabola, bounded by a chord is two-thirds of the circumscribing parallelogram. The properties of the solids formed by the revolution of the conic sections which he discovered, are equally striking and beautiful, and such as entitled him, when we consider his other discoveries, to the appellation of the Father of Mensuration.

In his Arenarius, or Treatise on the number of the Sands, he attempted to show the possibility of expressing by numbers the grains of sand that would fill the whole space of the universe. In this work, he pointed out a property of a geometrical progression that was afterwards made the foundation of the theory of logarithms; so near was this great man to one of the finest inventions of modern times. Had the mode of notation employed by the Greeks, though vastly superior to that of any other ancient nation, been less cumbrous than it was, there can be no doubt but Archimedes would have anticipated many discoveries of the moderns. Indeed it is wonderful that he did not attempt to simplify that notation; but the tide of his ideas had already flowed beyond it, and, in the long series of ages that succeeded, no genius less lofty was found, to supply the deficiency, till the touch of science again illumed the world. In fine, the writings of Archimedes constitute some of the most precious relics of antiquity, and show that, though the progress of discovery is in general slow, there are some who can pass the point where men of ordinary capacities are at a stand, and, by the vigor of their minds, anticipate the labor of ages.

(*To be continued.*)

Heat by Friction.

One class of philosophers say that "the sensation of heat is produced by a certain imponderable form of matter," and another class contend that heat consists "in the motion among the particles of bodies," communicated an apparent vacuum by the waving of a subtile elastic medium, *which is* also concerned in the phenomena of light.

The production of heat by mechanical means, appears to be considered as furnishing the strongest argument against the materiality of heat. Therefore, to show how the mechanical production of heat can be explained consistently with the theory that heat is material, is to add considerably to the strength of that theory. The material theory is well supported by the phenomenon of expansion, fusion, vaporisation, conduction, condensation, radiation, reflection, and refraction; but the production of heat by friction and percussion, is thought to be best explained by the theory that heat is motion.

We must first suppose caloric to be repulsive of itself, but that it is attracted by matter.

The heat evolved by the condensation or compression of matter, is readily explained by the material theory; for supposing 10 cubic feet of any substance to contain 5,000 atoms of caloric, we have in this case 500 atoms of caloric to each cubic foot of matter; but if the substance be subjected to a force which shall compress it to one-half of its former bulk, we shall then have 1000 atoms of caloric, instead of 500, to each cubic foot of matter, and accordingly a considerable increase of sensible heat. Now, friction and percussion can be explained in just the same manner. Friction is a compound of compression and motion.

Berthollet, by subjecting metals to the stroke of a coining-press, found that the degree of heat produced by percussion is always in proportion to the degree of condensation. The first stroke was more effectual than the second, and the second than the third, both with regard to heat and condensation.

Count Rumford's experiments on frictional heat in the boring of cannon, are considered to raise considerable objections against the theory of caloric. In a half an hour, by the mere process of boring, he raised the temperature of a cannon from 60° to 130°. The borer was pressed against the cannon, on an area of two square inches with a force of 10,000 lbs. avoirdupois. The apparatus was wrapped in flannel and worked by horses; and the borer made 960 turns in the half hour. This philosopher likewise bored a cylinder of brass, insulated in water. The borer was made to revolve by machinery, 32 times in a minute. At first the temperature was 60°, but after an hour's boring it was 107°; and in 2½ hours the water boiled. The whole apparatus, weighing 15 lbs., was raised to the same temperature.

These experiments are considered to prove that heat may be obtained without limitation, by the friction of insulated metals; and it is argued, that what can be obtained from insulated bodies without limitation, cannot be material. But one great source of heat is overlooked in this reasoning, viz. the condensation of the metallic borings. It is unreasonable to suppose that a pressure of 10,000 lbs. could be exerted upon two square inches without producing some degree of compression. This compression causes an increase of heat in the condensed part, and the caloric thus rendered active is rapidly diffused through the cylinder, while at the same time the part compressed is cut away by the borer; so that the borings are condensed pieces of metal which have had some of their caloric squeezed out of them into the cylinder, which is thereby rendered hotter. Doubtless, if the bulk of the particles abraided were to be found, by immersing them in water, it would be found that they occupied less space than when they formed part of the solid cylinder. Some persons may be disposed to doubt, whether cold iron can contain sufficient caloric to raise its temperature so high; but let us consider, that matter attracts caloric, and iron is a very dense body, and accordingly must attract and retain caloric with considerable power; and this is the reason why it appears cold, when it really contains a great deal of heat. According to Dr. Black, this power of retaining strongly a certain portion of latent heat, gives the metals their ductibility. Moreover, as a great increase of heat in metals is requisite to produce a slight expansion, it might be expected that a slight degree of compression should cause a great revolution of heat.

From this consideration of the subject, it appears of very little consequence whether the metals undergoing friction are insulated or not, seeing that the heat can be produced directly from the bodies themselves.

Sir H. Davy, by making two pieces of ice rub against each other in vacuo, produced enough heat to melt them. This case is analagous to the boring of cannon. Certain particles of ice are compressed and abraided, and their caloric squeezed out and rendered active by the condensation. The analogy is still further supported by the superior density of the watery particles compared with the icy ones. Similar reasoning will apply to Boyle's experiment of producing heat by the friction of brass in vacuo.

Boring wood with a gimlet is also analagous to the boring of cannon; only in the former case, the metal having a stronger attraction for caloric than the wood has, it receives the greater part of the heat, and the gimlet soon becomes hot. This is the case in the school-boy's experiment of rubbing a button on a plank; caloric is squeezed out of the wood by the compression of its parts, and the button receives most of the caloric, owing to its strong attraction for it. It is easier to produce heat from the friction of rough surfaces than smooth ones, because in the former case certain particles are rubbed off, which being small, are readily condensed, and made to evolve their latent caloric.

Fulminating compounds are substances capable of igniting with a small degree of heat. When undergoing compression or percussion, their bulk is reduced, and their caloric concentrated in a degree sufficient to cause their ignition. When a chemical match is drawn over sand-paper, certain phosphoric particles are rubbed off, and being compressed between the match and the paper, their heat is raised sufficiently high to ignite them, and fire the match. If the match be drawn over a smooth surface, the compression must be increased, for the temperature of the whole phosphoric mass must be raised in order to cause ignition.

Dr. Young, in arguing against the material hypothesis, says that "if the repulsive particles of caloric followed each other at a distance they would still approach near enough to each other in the focus of a burning glass, to have their motions deflected from a rectilinear direction." Perhaps this is the case, for we cannot see heat but it is actually found in the prismatic spectrum, that the heating rays extend beyond and outside the illuminating rays.

Casting Bells.

Large bells are usually cast in loam moulds, being swept up, by means of wooden or metal patterns, whose contour is an exact representation of the inner and outer surfaces of the intended bell. Sometimes, indeed, the whole exterior of the bell is moulded in wax, which serves as a model to form the impression in the sand, the wax being melted out, previous to pouring in the metal. This plan is rarely pursued, and is only feasible when the casting is small. The inscriptions, ornamental scrolls, &c. usually found on bells, are put on the clay mould separately, being moulded in wax or clay, and stuck on while soft. The same plan is also pursued with regard to the ears, or supporting lugs, by which the bell is hung.

Islands of Maine.

The Hon. H. Hamblin in a recent lecture before the Mechanics Association, in Bangor, Me., stated that in no part of the world were there, in the same distance, so many beautiful Islands as there are on the coast of Maine. He did not know how many there were. Mr. Williamson, in his history, states that there were about 400, but in fact there were about 1000 islands and islets; the larger portion of them within a space of 130 miles east of Cape Elizabeth. In the eastern part of the State, between Machias Bay and Quoddy Head, there were but very few islands. The coast in that part of the State was bold and the water in violent southeast storms, frequently dashed against it with sufficient power to be thrown into the air 100 feet.

The climate of the islands is much milder than upon the main, the winters being at least two months shorter. It has been ascertained that the range of the thermometer was from twenty to thirty degrees less upon the islands than in the same parallel of latitude upon the main land.

The islands are all noted for their salubrity, and upon some of them it is said, that when people grow very old, they were obliged to move on to the main land, in order to die.

The people upon the islands are very hospitable and generous-hearted. There are, in fact, but few, if any poor people upon our islands, and they never suffer from hunger, because they can, at any time, resort to the clam bank and fishing-ground.

The Orphan's Gratitude.

Hon. A. H. Stephens, of Georgia, in a recent address at a meeting in Alexandria, for the benefit of the Orphan Asylum and Free School, of that city, related the following anecdote:

"A poor little boy in a cold night in June, with no home or roof to shelter his head, no paternal or maternal guardian or guide to protect or direct him on his way, reached at nightfall the house of a rich planter, who took him in, fed, lodged and sent him on his way, with his blessing. Those kind attentions cheered his heart and inspired him with fresh courage to battle with the obstacles of life. Years rolled round: Providence led him on, he had reached the legal profession: his host had died; the cormorants that prey on the substance of man had formed a conspiracy to get from the widow her estates. She sent for the nearest counsel to commit her cause to him, and that counsel proved to be the orphan boy years before welcomed and entertained by her deceased husband. The stimulus of a warm and tenacious gratitude was now added to the ordinary motive connected with the profession. He undertook her cause with a will not easy to be resisted, he gained it; the widow's estates were secured to her in perpetuity; and Mr. Stephen's added, with an emphasis of emotion that sent its electric thrill throughout the house, "that orphan boy stands before you!"

Anecdote of Allston.

Some years after Allston had acquired a considerable reputation as a painter, a friend showed him a miniature, and begged he would give his sincere opinion upon its merits, as the young man who drew it had some thoughts of becoming a painter by profession. Allston after much pressing, and declining to give an opinion, candidly told the gentleman he feared the lad would never do anything as a painter, and advised his following some more congenial pursuit. His friend then convinced him that the work had been done by Allston himself for this very gentleman, when Allston was very young!

Jewish Customs.

Among the inquiries addressed to Major Noah, we find the following together with his answer:

"Was it ever the practice of the Jewish law to make malefactors drunk before execution? No. But they gave the condemned a cup of wine, in which there was frankincense to render him insensible to pain; and the compassionate ladies of Jerusalem provided this draught at their own expense. The custom is founded on the Proverbs of Solomon, chap. 13, 6th verse: "Give strong drink to him that is ready to perish and wine to those that be of heavy heart."

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TO CORRESPONDENTS.

"J. M. S. of Va."—Your Topographer would be a valuable acquisition to science. We shall notice it next week so as to secure you as the original inventor, but we do not know of any person, who, at present would enter into the engagements you speak of. You must superintend the model yourself.

"J. C. of Mass."—Your papers have been forwarded to you, but the old pencil drawings are not to be found.

"J. C. M. of Mich."—Your letter enclosing a draft from the Michigan Insurance Company has come to hand and as soon as your model is received you will hear from us by mail.

"R. D. of Woodstock, Vt."—Your engravings and stereotype plates are ready for you and subject to your order.

"H. T. P. of S. C."—The first edition of those plates of the Low Pressure Engine are all exhausted and we shall be obliged to issue a new edition before filling your order. In about one week we shall be able to supply you.

"E. B. of Ind."—The "Picket Machine" to which you refer has been disposed of and we cannot inform you where another could be purchased. If you wish to ascertain all the particulars in regard to Johnson's shingle machine you had better address him by letter. We are not agents for the sale of it. The book was duly forwarded.

"H. T. S. of O."—Sometime since we forwarded to you the valuable receipts which you ordered from us and have been expecting the promised funds in return. Did the documents not reach you or why this delay in remitting the pay for them?

"H. N. C. of N. Y."—From an article in this week's paper you will notice that we have once published an engraving and description of the famous Balloon so much talked of at the present time. If you have never seen an account of it in the "Scientific American" it is no fault of ours. We do not doubt the possibility of ærial carriages becoming sometime in use but the idea of the one to which you refer being successful is preposterous. $3 received, all right.

"S. T. B of R. I."—On January 16th we sent you the specification of your Yankee Stove by mail, and since that date we have had no tidings of you—will you please let us hear from you immediately; we do our part of Patent office business promptly and we desire that our patrons would be equally particular in fulfilling the part they are required to perform.

"C. D. of Pa.—It is ungenerous in you to suppose that we can devote a half day's time in perusing your long tedious letter without remuneration. Send us $3 and we will carefully investigate your invention and advise accordingly.

"H. F D. of Pa."—We are sending quite a number of Scientific Americans to San Francisco now and if you desire it we can send yours in the same parcel with our other subscribers. We have several local agents in Texas and Mexico butnone in California yet.

"B. G. W. of Pa."—On page 316 vol. 3, of Scientific American you will perceive an engraving of a plan for applying the steam direct to the working of saws as described by you. $2 received.

"E. G. Y. of Pa."—We could furnish you with an engine of the capacity you mention complete with a boiler for $200, but our terms would be cash.

"W. D. L. of Ohio."—An electro magnetic engine has been constructed to move at the rate of 8 miles per hour on a railroad. Electro magnetic engines have been quite common for a number of years past. We have seen some far more complete than the one represented in your drawing. You are, however, in pursuit of an interesting discovery viz; a cheap substitute for steam—persevere.

"A. B. of N. C."—We cannot comply with your request without an equivalent for the information. You cannot get a work on the subject—one that is a safe guide. We will sell you a warranted receipt for scarlet and red on wool for $3,00.

"J. M. S. of Miss." and "R. P. of N. Y."—We have answered you by mail.

"C. H. F. of Del."—Your model is received and considering the size of the state from which you hail we think you deserve some credit. Still we cannot advise you to apply for a patent until you are better satisfied of its practical operation than is shown from your model.

"D. W. of Me."—Why is it that you do not let us hear from you concerning your patent business;—we forwarded your specification for signatures several weeks ago.

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"W. C. H. of Vt." "H. W. B. of N. Y." "H. & S. of Pa." and "C. H F. of Ms."—We have forwarded to you your specifications for signing and hope you will return them to us as soon as possible.

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"R. T. of Ohio."—We would not advise you to be at the expence of applying for a patent, if granted it would scarcely pay you for the expence and trouble.

"J. C. M. of N. Y."—Your model and funds have been received and your drawings and specification are now being examined and corrected.

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A Premium and Diploma were awarded by the New York Rensselaer Co. Fair, to S. Lichtenthaeler, for his patent Blind fixtures, being an apparatus for Opening and Shutting outside Window Blinds, from the inside of the house, without raising the sash.

Persons desirous of obtaining patent rights of this invention for any of the Southern or Western States, will apply to the undersigned Patentee (the rights for the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Michigan, Ohio, Pennsylyania, Delaware, Maryland, the 11 northern counties of New Jersey, and the District of Columbia, are all sold off.)

S. LICHTENTHAELER.
Litiz, Lancaster, Co., Pa.

Notice.—All power of attorney given to C. H. Farnham, has been cancelled, and is hereafter null, and void, and he is therefore no longer authorized to sell, or transact any business appertaining to the above invention for me S. Lichtenthaeler.
j27 2m*

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For the Scientific American.

Poisonous Metals.—Lead.

Poisoning by carbonate of lead not unfrequently happens among painters and white lead manufacturers. The poison finds its way into the system in very minute quantities, causing the complaint known as Painter's Colic—and Paralysis. Dr. Thompson considers that the carbonate of lead is the only compound that possesses evil properties, but this is an error, and Dr. Christisson is of this opinion. The carbonate of lead turns black by being exposed to the fumes of sulphuretted hydrogen.

The most important forms of poisoning by lead, is by the action exerted on it by water. The injurious properties of water conveyed through lead pipes were known in the days of Julius Cæsar. Drs. Lamb, *Guyton Morveau*, Drs. Thompson and Christisson, likewise Colonel Yorke and Mr. Taylor, have made considerable research into the nature of lead and the action of different waters upon it. Different conclusions have been arrived at by some of these gentlemen, but from their discoveries, it would appear that distilled water from which all gases were expelled by boiling, when excluded from the atmosphere, exerted no action upon lead. But if air which is free from carbonic acid have access, a quantity of white matter is soon formed, which settles at the bottom in the form of a white powder, and is found to be the hydrated oxide of lead. Dr. Christisson says that if the surface of the distilled water be exposed to the air in a leaden vessel, the substance formed consists of minute brilliant scales, which consists of two equivalents of neutral carbonate and one of hydrated protoxide.—Distilled waters therefore cannot with safety be kept in leaden vessels, and the distilled waters of fragrant herbs exert a powerful action upon lead. All neutral salts possess in a greater or less degree, the nature of lessening the corroding power of water; 1-4000 part of the sulphate of lime, 1-3000 of the phosphate of soda, and 1-2000 part of the muriate of soda prevents the carbonate of lead being formed by the action of the air and water. Mr. Taylor asserts, that if 1-5000 part of the sulphate of lime be combined with the water, no carbonate of lead will be formed. Rain and snow water act upon lead almost as quick as distilled water. Water collected from leaden gutters should never be used for cooking. It has been found that most spring waters contain muriates and sulphates and their action upon lead is therefore very small, but prudence would suggest to every one the propriety of submitting all waters to a careful analysis, before conducting it through leaden tubes for domestic purposes. The Croton water that supplies this city is generally considered safe, and no fears of any bad consequence need be entertained from lead pipes if the water is allowed to flow freely before using. It is not prudent, however, according to the analysis of Dr. Chilton, to use the Croton water, if it has stood a considerable time in a lead pipe, or leaden vessel. We believe that there is no substance equal to cotton wool as a purifier of water impregnated with lead. It would be well to use it in the small filters in place of felt. It is peculiar in its purifying nature. The carbonates of lead unite with it chemically, not mechanically, and we need not be surprised at this, after the discovery of gun cotton. In summer the cotton would make a very cheap and easily renewing filtering material, and we would like to see it generally introduced for this purpose, as we are confident that it would be a public benefit.

Dyeing Catcheeu Colors on Cotton.

To 10 pounds of cotton goods, boil up 2½ pounds shumac, and steep the yarn or cloth (every dyer knows the manner,) in the liquor for 8 or 10 hours, then squeeze or wring them out and run them through a tub of the black oxide of iron at 3°, after which, wring them out and clear with soda ley, then wash, wring up, and put the goods through hot liquor of catchecu, at the the rate of 2 pounds to the 10 and 2 pounds of logwood, some more, and some not quite as much; there is a great difference in the quality of this eastern drug. Afterwards, run the goods through a solution of soda ley to blue down, as the dyer calls it; that is to take away the brown shade of the catchecu.

Catchecu is most extensively used in dyeing browns and drabs. It is an astringent substance, used in chewing with the beteel nut, by the Hindoos.

Browns.—To 10 lbs. goods, give 2 lbs. of catchecu as warm as it possibly can be handled, allowing 1½ of catchecu at each run, or giving the goods two dips and 1 gill of the nitrate of copper in tubs, at each dip by itself, then run through a solution of the chromate of potash.

Drabs are done in the same manner as the browns; but sometimes, (as the shade is wanted,) get some sulphate of iron in tubs separate, before getting the chrome, and they are cleared up, first, by running the goods through a tub in milk warm water in which there is about a gill of muriate acid, then washed and run through a tub of soda ley, and then washed and finished.

Madder Black.—The old fast black was done by first immersing in shumac 2½ lbs. to the ten of goods, washing them out and then giving them a dip in the blue vat, afterwards a mordaunt of the oxide of iron, cleared with soda ley, washed and dyed in a madder bath at the rate of 70 or 80 pounds to the 50 of goods.

Iodine—Bromine—Fluorine.

These substances are not much employed in the arts. Iodine produces, when united with different metals, some of the most beautiful colors; yet, with very few instances to the contrary, it cannot be employed in the art of dyeing, as all these colors are fugitive. Its use is chiefly confined to medicine, as it is found to promote in a remarkable degree the action of the absorbents; in over-doses, however, it is an iraitant poison. It is also used in the Daugerreotype and Talbotype processes.

Bromine is the only simple body besides mercury that exists as a liquid at the ordinary temperature. It is about three times as heavy as water, and of a red color; the only application of this substance in the arts, is for the quickening of the process in taking photographic portraits, by Daugerre's system, and fixing the impression in Talbot's method.

Fluorine has never been obtained in an insulated state, for its power of combination is so great that no body has as yet been found capable of resisting its energetic action. It may be obtained in combination with hydrogen from fluor spar (fluoride of calcium), by the action of sulphuric acid, heat being at the same time employed to raise its temperature to about 200°. A gas is then given off, which is this compound of fluorine and hydrogen—(hydrofluoric acid.) This gas is easily condensen into a liquid by refrigeration. The liquid acid thus obtained, is the most corrosive acid now known; it acts on metals energetically, but has no action on lead or silver. The retort from which it is distilled, as also the receiver and bottle intended to contain it, must, therefore, be made of either of these two metals. A glass vessel would be speedily dissolved by it. It is used for engraving on glass. In using the strong acid, great caution should be observed not to spill it on any part of the body, as its corrosive nature is such that fatal consequences might ensue were it not instantly washed off.

Floating Iron.

Dr. McCurdy, of Alabama, has lately been lecturing in Mobile and exhibiting iron rendered floatable by some recent chemical discovery.

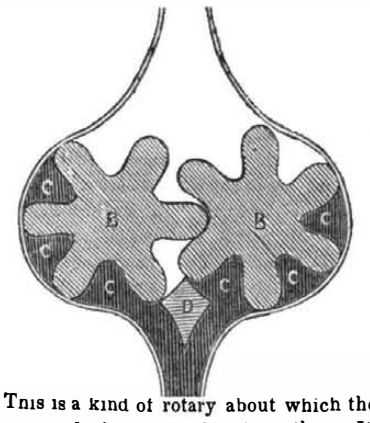
We hope he will visit these quarters. It will not accord with theory, that a lighter body can support a denser body of equal bulk, and in that case, our opinions regarding floating solid iron, must remain in *statu quo* till we see for ourselves. Iron ships float, but the Dr. as we understand it, can rival the old witches that used to float horse shoes and cart wheels.

History of the Rotary Engine.

Prepared expressly for the Scientific American.

WHEEL ROTARY STEAM ENGINE.

Fig. 48.



This is a kind of rotary about which there are some doubts respecting the author. It is claimed by one as a French and by another as an English invention of one Mr. J. White.—There need not be much war, however, about its value, as any person can see at a glance.—It consists of two broad fluted wheels confined in a steam tight case. A A, is the case, and B B, the fluted wheels. The wheels are made so as the teeth fit exactly into one another and the opposite sides of which in turning work steam tight in the case, which is made to suit the circle described by the wheels. At C, the steam is pressing on the extremities of the wheels. D, is a division to keep the steam from exerting its force when the rollers join at the middle. E, is the steam, and F, the exhaust pipe.

This rotary was also proposed for a pump as well as a steam engine and is described in Ewbank, also in the Mechanic's Magazine of 1825. It is very evident to any observing man that one wheel with the teeth for pistons, would answer a far better purpose than the two herein represented, there would be less friction. It has been the great fault of rotary engine inventors, to forget that steam is not of a nature to run round about like a cart wheel. It has a tendency to move in a straight line and exerts a force in a straight line like a projectile, when admitted from the boiler pipe.

Neutralization of Putrid Miasmata.

In 1773 the Cathedral of Dijon was so infected by putrid exhalations, that it was deserted altogether, after unsuccessful attempts to purify it.

Application was made to Mr. Morveau, the celebrated chemist, and at that time Professor of Chemistry at Dijon, to see whether he knew any method of destroying these exhalations.

Having poured two pounds of sulphuric acid on six pounds of common salt, contained in a glass vessel, which had been placed on a few live coals in the middle of the church, he withdrew precipitately and shut all the doors. The muriatic acid gas that came off soon filled the whole Cathedral, and could even be perceived at the door; after twelve hours the doors were thrown open, and a current of air made to pass throughout the place to remove the gas. This destroyed completely every putrid odour.

But the advanced state of science has shown that the disinfecting agent in the above experiment of Morveau was chlorine, and to effect the same purpose, chemists now make use of this gas, (chlorine), condensed by lime from which it can be set free as required, either by heat, or any dilute acid.

Horse Taming.

A horse tamer named Offut, has created quite a sensation in Columbus, (Geo.) by some of his feats. The Democrat thus records one of them:

"Col. James C. Holland has a wild foolish animal that would never suffer him while riding to come near the tap of a drum. He was slow to believe that Mr O. could do anything with her, but it took only a few moments for the latter to enter the stable, saddle and bridle the filly, and cause her to follow him quietly out, he beating a drum a few paces in advance. He then mounted, with the drum in his hand, beat the same while on horseback, then dismounted and tied up the reins, causing this now docile animal to follow him like a well trained soldier at the sound of music, and obedient to every word! This and other experiments were witnessed by several citizens, to their entire satisfaction."

Longevity of the Damask Rose.

There is a rose-bush flourishing at the residence of A. Murray McIlvaine, near Bristol, Pa, known to be more than a hundred years old. In the year 1742 there was a kitchen built, which encroached on the corner of the garden, and the mason laid the corner stone with great care, saying "it was a pity to destroy so pretty a bush." Since then it has never failed to produce a profusion of roses shedding around the most delicious of all perfumes. Sometimes it has climbed for years over the second story windows, and then declined by degrees to the ordinary height. The fifth generation is now regaled with its sweets. Not far from this venerable bush, is a tree, of the same age, now measuring 35 feet circumference—a Buttonwood

Another pretended Cure for Hydrophobia.

At Udina, in Friule, a poor man lying under the frightful torture of hydrophobia was cured with some draughts of pure vinegar, given him by mistake instead of another potion. A physician at Padua got intelligence of this event at Udina, and tried the same remedy upon a patient at the hospital, administering to him a pound of vinegar, in the morning, another at noon, and the third at sunset, and the man was speedily and perfectly cured.

Cure for the Bite of the Rattlesnake.

Dr. James Whitney, of Woodford, Co. Ill., states that he has successfully in a number of cases treated the bite of the rattle snake with the tinctnre of iodine of the strength sold by druggists. He painted the part that was bitten as far as the swelling extended with four coats of the iodine, first, four coats before going to bed, and four in the morning, and afterwards physiced well. He believes that the iodine being absorbed by the system, comes in confact with the poison and neutralizes it. The wound is kept open during the treatment.

Snow Balls in Horses Feet.

It is stated that soft soap, well rubbed into the bottom of hoofs when clean, and before the horse leaves the stable, will prevent the collection of balls of snow. This is no doubt true to a certain extent, that is, as long as the soap lasts.

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